31. A transmitter in accordance with claim 30 wherein the predetermined path has a contour corresponding to a roadway contour and the anticipated motion of the mobile unit is on the roadway.

32. A transmitter in accordance with claim 31, wherein the transmitter is further adapted to travel on a conveyor device along the predetermined path.

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33. A transmitter in accordance with claim 32, wherein the signal corresponds to a received signal received at the transmitter from a fixed radio port.

34. A receiver adapted to receive a signal from a mobile unit while the receiver has a motion relative to Earth along a predetermined path and in accordance with an anticipated motion of the mobile unit, wherein the motion of the receiver is controlled independently to the anticipated motion of the mobile unit.

35. A receiver in accordance with claim 34 wherein the predetermined path has a contour corresponding to a roadway contour and the anticipated motion of the mobile unit is on the roadway.

36. A receiver in accordance with claim 35, wherein the receiver is further adapted to travel on a conveyor device along the predetermined path.

37. An apparatus adapted to move in accordance with a motion of a mobile unit wherein the motion is relative to a fixed radio port, the apparatus comprising:

SUB B1

a receiver adapted to receive a signal transmitted from the fixed radio port within a frequency band higher than a low frequency radio frequency band; and

a transmitter adapted to transmit a resultant signal within the frequency band to the mobile unit in accordance with the signal transmitted from the fixed radio port.

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SUB C1

38. An apparatus in accordance with claim 37, wherein the frequency band has a lower limit of 300 megahertz.

39. An apparatus in accordance with claim 38, wherein the frequency band is an optical frequency band.

SUB B2

40. An apparatus in accordance with claim 38, wherein the frequency band is a millimeter wave frequency band.

41. An apparatus in accordance with claim 40, wherein the frequency band comprises a frequency spectrum from 50 GHz to 70 GHz.

42. An apparatus in accordance with claim 41, wherein the frequency band is an oxygen absorption frequency band.

SUB B2

43. An apparatus adapted to move in accordance with a motion of a mobile unit wherein the motion is relative to a fixed radio port, the apparatus comprising:

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a receiver adapted to receive a signal transmitted from the mobile unit within a frequency band higher than a low frequency radio frequency band; and

a transmitter adapted to transmit a resultant signal within the frequency band to the fixed radio port in accordance with the signal transmitted from the mobile unit.

44. An apparatus in accordance with claim 43, wherein the frequency band has a lower limit of 300 megahertz.

45. An apparatus in accordance with claim 44, wherein the frequency band is an optical frequency band.

SUB B3

46. An apparatus in accordance with claim 44, wherein the frequency band is a millimeter wave frequency band.

47. An apparatus in accordance with claim 46, wherein the frequency band comprises a frequency spectrum from 50 GHz to 70 GHz.

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B3

48. An apparatus in accordance with claim 47, wherein the frequency band is an oxygen absorption frequency band.

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49. A movable base station adapted to establish a communication link between a fixed port and mobile unit while the movable base station has a motion relative to Earth along a predetermined path and in accordance with an anticipated motion of the mobile unit, wherein the motion of the movable base station is controlled independently to the anticipated motion of the mobile unit.

50. A movable base station in accordance with claim 49, wherein the motion of the movable base station is based, at least in part, on a speed of the mobile unit.

51. A movable base station in accordance with claim 50, wherein the motion of the movable base station is based, at least in part, on a speed of a another mobile unit.

52. A movable base station in accordance with claim 51, wherein the motion of the mobile base station is based, at least in part, on a received signal strength of a signal transmitted by the mobile unit.

53. A movable base station in accordance with claim 52, wherein the motion of the mobile base station is based, at least in part, on another received signal strength of another signal transmitted by the another mobile unit.

54. A movable base station adapted to have a motion relative to a fixed port along a predetermined path and in accordance with an anticipated motion of a mobile unit, comprising:

a first radio interface adapted to establish a first communication link between the movable base station and the mobile unit; and

a second radio interface adapted to establish a second communication link between the movable base station and the fixed port, wherein the motion of the movable base station is independently controllable to the motion of the mobile unit.

55. A movable base station in accordance with claim 54, wherein the first communication link and the second communication are established within a frequency band higher than a low frequency radio frequency band.

56. A movable base station in accordance with claim 55, wherein the frequency band has a lower limit of 300 megahertz.

57. A movable base station in accordance with claim 56, wherein the frequency band is an optical frequency band.

SUB B5

58. A movable base station in accordance with claim 56, wherein the frequency band is a millimeter wave frequency band.

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59. A movable base station in accordance with claim 58, wherein the frequency band comprises a frequency spectrum from 50 GHz to 70 GHz.

60. A movable base station in accordance with claim 59, wherein the frequency band is an oxygen absorption frequency band.

61. A movable base station in accordance with claim 54 wherein the predetermined path has a contour corresponding to a roadway contour and the anticipated motion of the mobile unit is on the roadway.

62. A movable base station in accordance with claim 61, wherein the movable base station is further adapted to travel on a conveyor device along the predetermined path.

SUB B6

63. An apparatus adapted to move in accordance with a movement of mobile unit moving relative to a plurality of fixed radio ports, the apparatus comprising:

a receiver adapted to receive a plurality of signals, each of the plurality of signals transmitted from each of the plurality of fixed radio ports within a frequency band higher than a low frequency radio frequency band;

SUB B6

a transmitter adapted to transmit, within the frequency band, a resultant signal to the mobile unit in accordance with at least one of the plurality of signals; and a processor adapted to maximize an amount of transferred information to the mobile unit by evaluating a quality of each of the plurality of signals transmitted from the plurality of fixed radio ports.

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64. An apparatus in accordance with claim 63, wherein the frequency band has a lower limit of 300 megahertz.

65. An apparatus in accordance with claim 64, wherein the frequency band is an optical frequency band.

SUB B7

66. An apparatus in accordance with claim 64, wherein the frequency band is a millimeter wave frequency band.

67. An apparatus in accordance with claim 65, wherein the frequency band comprises a frequency spectrum from 50 GHz to 70 GHz.

68. An apparatus in accordance with claim 67, wherein the frequency band is an oxygen absorption frequency band.

SUB B7

69. An apparatus in accordance with claim 73, wherein the processor is further adapted to determine a best fixed radio port of the plurality of fixed radio ports, the best fixed radio port enabling the maximization of the amount of transferred information to the mobile unit.

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70. An apparatus in accordance with claim 69, wherein the transmitter is further adapted to transmit the resultant signal in accordance with the signal transmitted from the best fixed radio port.

71. An apparatus in accordance with claim 70, wherein the processor is further adapted to determine a plurality of best fixed radio ports and to combine a group of signals of the plurality of signals to produce the resultant signal, the group of signals transmitted from the plurality of best fixed radio ports.

72. An apparatus in accordance with claim 71, wherein the processor is further adapted to combine the group of signals by synchronizing the group of signals to produce a plurality of synchronized signals and combining the plurality of synchronized signals in

accordance with the quality of each of the plurality of synchronized signals to produce the resultant signal.

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73. An apparatus in accordance with claim 63, wherein the amount of information transferred to the mobile unit is maximized by transmitting the information through at least one of the plurality of fixed radio ports, the at least one fixed radio port providing a greatest quality communication link between the at least one fixed radio port and the mobile unit in relation to other communication links between other fixed radio ports of the plurality of fixed radio ports and the mobile unit.

74. An apparatus in accordance with claim 73, wherein the greatest quality communication link comprises:

a first wireless communication link between the at least one fixed radio port and the receiver; and

a second wireless communication link between the transmitter and the mobile unit.

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75. An apparatus adapted to move in accordance with a movement of a plurality of mobile units moving relative to a plurality of fixed radio ports at a velocity greater than a relative velocity of movement between each of the mobile units of the plurality of mobile units, the apparatus comprising:

a first radio interface adapted to communicate with the plurality of fixed radio ports in a frequency band;

SUB B8

a second radio interface adapted to communicate with the plurality of mobile units in the frequency bandwidth, the frequency band higher than a low frequency radio frequency band; and

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a processor adapted to establish a communication link between the plurality of mobile units and at least one of the plurality of fixed radio ports based on a plurality of signal quality indicators, each of the signal quality indicators corresponding to each of a plurality of transmitted signals transmitted from the plurality of fixed radio ports.

76. An apparatus in accordance with claim 75, wherein the frequency band has a lower limit of 300 megahertz.

77. An apparatus in accordance with claim 76, wherein the frequency band is an optical frequency band.

SUB B9

78. An apparatus in accordance with claim 76, wherein the frequency band is a millimeter wave frequency band.

79. An apparatus in accordance with claim 78, wherein the frequency band comprises a frequency spectrum from 50 GHz to 70 GHz.

SuB B9

80. An apparatus in accordance with claim 79, wherein the frequency band is an oxygen absorption frequency band.

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81. An apparatus in accordance with claim 75, wherein the processor is further adapted to establish a second communication link between the plurality of mobile units and a least a second of the plurality of fixed radio ports based on the plurality of signal quality indicators.

82. An apparatus in accordance with claim 81, wherein the apparatus is further adapted to move along a predetermined path between the plurality of mobile units and the plurality of fixed radio ports.

83. A communication system adapted to simultaneously provide a communication channel having a data rate of at least 2 megabits per second to each of a plurality of mobile units traveling at a speed greater than 45 kilometers per hour, wherein the density of mobile units to geographic area is at least 6,500 mobile users per square kilometer.

SUB B10

84. A communication system adapted to simultaneously provide a communication channel having a data rate of at least 2 megabits per second to each of at least 12 mobile units traveling at a speed greater than 45 kilometers within a geographic area less than 1800 square meters.

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85. A communication system adapted to simultaneously provide a communication channel having a data rate of at least 144 kilobits per second to each of at least 24 mobile units traveling at a speed greater than 25 kilometers per hour within a geographic area less than 1000 square meters.

86. A communication system adapted to simultaneously provide a communication channel having a data rate of at least 20 megabits per second to each of at least 2 mobile units traveling at a speed greater than 50 kilometers per hour within a geographic area less than 1000 square meters.

87. A communication system adapted to simultaneously provide a communication channel having a data rate of at least 9.6 kilobits per second to each of at least 100 mobile units traveling at a speed greater than 45 kilometers per hour within a geographic area less than 1 square kilometer.

88. A communication system adapted to simultaneously provide a

communication channel having a data rate of at least 144 kilobits to each of at least 6 mobile units traveling at a speed greater than 45 kilometers per hour along a roadway wherein a longest distance between any two of the 6 mobile units is less than 60 meters.

89. A method of transmitting a signal to a mobile unit having an anticipated motion relative to Earth, the method comprising the steps of:

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controlling a motion of a transmitter along a predetermined path in accordance with the anticipated motion of the mobile unit, wherein the motion of the mobile unit is controlled independently to the motion of the transmitter; and

transmitting the signal to the mobile unit.

90. A method in accordance with claim 89, wherein the step of controlling comprises the steps of:

moving the transmitter along a conveying device deposited along the predetermined path; and

adjusting a speed of the transmitter in accordance with the motion of the mobile unit.

91. A method in accordance with claim 90, wherein the step of adjusting comprises the steps of:

observing a relative motion between the mobile unit and the transmitter; and adjusting the speed of the transmitter to minimize the relative motion between the mobile unit and the transmitter.

92. A method in accordance with claim 91, wherein the step of moving the transmitter comprises the steps of:

moving the transmitter next to a roadway;

calculating an average speed of a plurality of mobile units traveling along the roadway; and

adjusting the speed of the transmitter in accordance with the average speed.

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93. A method of receiving a signal transmitted from a mobile unit having an anticipated motion relative to Earth, the method comprising the steps of:

controlling a motion of a receiver along a predetermined path in accordance with the anticipated motion of the mobile unit, wherein the motion of the mobile unit is controlled independently to the motion of the receiver; and

receiving the signal at the receiver.

94. A method in accordance with claim 93, wherein the step of controlling comprises the steps of:

moving the receiver along a conveying device deposited along the predetermined path; and

adjusting a speed of the receiver in accordance with the motion of the mobile unit.

95. A method in accordance with claim 94, wherein the step of adjusting comprises the steps of:

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observing a relative motion between the mobile unit and the receiver; and

adjusting the speed of the receiver to minimize the relative motion between the mobile unit and the receiver.

96. A method in accordance with claim 95, wherein the step of moving the receiver comprises the steps of:

moving the receiver next to a roadway;

calculating an average speed of a plurality of mobile units traveling along the roadway; and

adjusting the speed of the receiver in accordance with the average speed.

SUB B11

97. A method of providing a communication link between a communication network and a mobile unit having a motion relative to a plurality of fixed ports, wherein the

plurality of fixed ports are communicatively coupled to the communication network, the method comprising the steps of:

SUB B11

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moving a movable base station in accordance with the motion of the mobile unit;

receiving a plurality of signals at the movable base station, each of the plurality of signals transmitted from each of the plurality of fixed radio ports within a frequency bandwidth higher than a low frequency radio frequency bandwidth;

transmitting, within the frequency band, a resultant signal to the mobile unit in accordance with at least one of the plurality of signals; and

maximizing an amount of transferred information to the mobile unit by evaluating a quality of each of the plurality of signals transmitted from the plurality of fixed radio ports.

98. An apparatus in accordance with claim 97, wherein the frequency band has a lower limit of 300 megahertz.

SUB B12

99. An apparatus in accordance with claim 98, wherein the frequency band is an optical frequency band.

100. An apparatus in accordance with claim 98, wherein the frequency band is a millimeter wave frequency band.

101. An apparatus in accordance with claim 99, wherein the frequency band comprises a frequency spectrum from 50 GHz to 70 GHz.

SUB B12

102. An apparatus in accordance with claim 101, wherein the frequency band is an oxygen absorption frequency band.

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103. A method of providing a communication connection between a communication network and a plurality of mobile units having a motion relative to a plurality of fixed ports, wherein the plurality of fixed ports are communicatively coupled to the communication network, the method comprising the steps of:

establishing a first communication link between the plurality of mobile units and a first fixed port of the plurality of fixed ports through a movable base station having a motion in accordance with the motion of the mobile units; and

simultaneously handing off the plurality of mobile units to a second fixed port of the plurality fixed ports.

104. A method in accordance with claim 103, wherein the step of simultaneously handing off the plurality of mobile units comprises the steps of:

combining a first incoming signal transmitted from the first fixed port and a second incoming signal transmitted from the second fixed port to produce a resultant signal; and

transmitting the resultant signal to the plurality of mobile units from the movable base station.

105. A method in accordance with claim 104, wherein the step of combining comprises the steps of:

determining a first quality of the first signal;

determining a second quality of the second signal; and

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adding the first signal to the second signal in accordance with the first quality and the second quality.

106. A method in accordance with claim 105, wherein the step of adding comprises the step of minimizing a contribution of the first signal to the resultant signal by ignoring the first signal.

107. A method comprising the step of simultaneously providing a communication channel having a data rate of at least 2 megabits per second to each of a plurality of mobile units traveling at a speed greater than 45 kilometers per hour, wherein the density of mobile units to geographic area is at least 6,500 mobile users per square kilometer.

Sub B13

108. A method comprising the step of simultaneously providing a communication channel having a data rate of at least 2 megabits per second to each of at least 12

SUB B13

mobile units traveling at a speed greater than 45 kilometers within a geographic area less than 1800 square meters.

109. A method comprising the step of simultaneously providing a communication channel having a data rate of at least 144 kilobits per second to each of at least 24 mobile units traveling at a speed greater than 25 kilometers per hour within a geographic area less than 1000 square meters.

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110. A method comprising the step of simultaneously providing a communication channel having a data rate of at least 20 megabits per second to each of at least 2 mobile units traveling at a speed greater than 50 kilometers per hour within a geographic area less than 1000 square meters.

111. A method comprising the step of simultaneously providing a communication channel having a data rate of at least 9.6 kilobits per second to each of at least 100 mobile units traveling at a speed greater than 45 kilometers per hour within a geographic area less than 1 square kilometer.

112. A method comprising the step of simultaneously providing a communication channel having a data rate of at least 144 kilobits to each of at least 6 mobile

A1 Concl.

units traveling at a speed greater than 45 kilometers per hour along a roadway wherein a longest distance between any two of the 6 mobile units is less than 60 meters.

Respectfully submitted,

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Date 9/22/99

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